EXECUTIVE SUMMARY

MISSILE ACCIDENT INVESTIGATION

Minuteman III Launch Facility A06
F.E. Warren AFB WY
23 May 2008

On 23 May 2008 at 1634 Mountain Standard Time (MST), Minuteman (MM) III Launch Facility (LF) A06, located near F.E. Warren AFB, WY, experienced a commercial (primary) power interruption. The LF automatically switched to backup power provided by a set of batteries located in the lower launcher equipment room (LER). The LF's battery charger, also located in the LER, had a loose electrical connection on a capacitor terminal. The battery charger had been modified by the 582d Missile Maintenance Squadron (582 MMXS) at Hill Air Force Base, Utah, to remove and replace capacitors that contained polychlorinated biphenyls (PCBs) with non-PCB components. The battery charger was installed at LF A06 on 4 March 2008. Between that date and 23 May 2008, the loose connection caused the charger to overcharge the batteries, which created excessive hydrogen gas (H_2) inside the LER. The H_2 accumulated to the point that it was flammable, and it was not sufficiently controlled or reduced by air circulation due to the LF's recently installed new environmental control system (ECS) that eliminated the flow of fresh or make-up air into the LER. A spark or fire from the loose connection inside the battery charger ignited the gas.

The fire ignited a shotgun storage case, destroyed the shotgun, and incinerated the shotgun shells. The burning of the shotgun case and its contents produced a large amount of soot, some of which was dispersed into launch support equipment racks and throughout the LER. The fire also ignited duct tape at the opening of the launch tube (LT), at the entrance for missile support cables including the lower and upper umbilical cables. The burning duct tape dripped onto a section of the lower umbilical cable where it ignited more duct tape. The fire charred the umbilical cable in several places, and burned through and short-circuited wires in the suspension system (pressure) monitor cables. On 28 May 2008, a maintenance team sent to resolve faults reported by sensors inside the LF discovered the evidence of the fire.

The AIB president found clear and convincing evidence the loose capacitor connection caused the mishap. The AIB president further found substantial evidence to conclude five factors substantially contributed to the mishap: First, the technical order (TO) provision concerning the installation of the capacitors in the LF battery charger is vague regarding the fastening of capacitor connection wires, which led to or permitted the loose connection. Second, 582 MMXS procedures for quality assurance (QA) evaluation of battery charger modifications and maintenance did not require visual or other direct inspection of the capacitor installation, which might have detected and corrected the loose connection. Third, modification of A06's ECS eliminated the flow of make-up fresh air into the LF and the LER. Some amount of fresh air might have prevented the H_2 build-up caused by the overcharged batteries from reaching the flammable concentration that fueled and spread the fire. Finally, the use of duct tape on the umbilical cables, and the holes cut in the shotgun case which exposed the internal foam insulation, introduced both of these flammable materials, absent which the fire might have extinguished itself after consuming the H_2 gas without causing further damage.